

REMARKS

The Office Action mailed September 22, 2005 and references cited therein have been reviewed. Applicants note that the Examiner withdrew the allowance of claims 11, 14, 37 and 39. Claims 3-8, 12, 13, 31-34, 38 and 65-67 were objected to, but were indicated as being allowable if rewritten in independent form.

The Examiner indicated that claims 17-22, 42-48, 50, 52, 55, 56 and 71 are withdrawn. Applicants agree, but request that such claims be reconsidered once an independent claim has been indicated as being allowable.

The Examiner objected to the drawings for not showing the helical limitation in several of the claims. Applicants have amended claims 27, 28 and 49 to change the word "helical" to "curved". Applicants submit that the drawings illustrate this feature of the lower portion of the tube.

THE SECTION 103 REJECTIONS

Claims 1-2, 23,-28, 49, 51, 53, 54, 57-60, 62-64 and 72-74 were rejected under 35 U.S.C. §103(a) as being unpatentable over FR 266118. The Examiner only provided an English abstract of the French patent publication. The abstract provides no information regarding device 3. Applicants obtained a computer automated translation of the French patent publication. This translation has not been reviewed by a human translator. A copy of this computer automated translation is enclosed. The English translation reveals that very little is disclosed in device 3. Device 3 is disclosed in the figures and the translation as being a tube of some undisclosed material.

The tube in the French patent publication is not disclosed as being flexible as required in claims 1, 29 and 62. The tube in the French patent publication is not disclosed as having the weight distribution as defined in claim 2, 30, and 64. The tube in the French patent publication is not disclosed as including any type of beveled end as required in claims 11-14, 37-39, 68 and 69. The

tube in the French patent publication is not disclosed as including a bevel or a passageway that includes a low friction material as required in claims 14-16, 39-41, 69 and 70. The tube in the French patent publication is not disclosed as including a lower portion that is curved as required in claims 27, 28, 49 and 76. For at least the reasons set forth above, the French patent publication does not make obvious any of the pending claims.

The Examiner asserted that it would have been obvious to make device 3 flexible or curved. The English translation on page 5 indicated that device 3 is a single straight tubular part for imposing tension and rectification on wire 1. As such, these teachings are contrary to teaching that the tube is at least partially flexible.

The Examiner also asserted that device 3 is made of a synthetic material. There is no support for this assertion based on the abstract provided by the Examiner or from the computer automated translation of the French patent publication.

The Examiner also asserted that device 3 had a passageway diameter that is at least twice the diameter of the wire. There is no support for this assertion based on the abstract provided by the Examiner or from the computer automated translation of the French patent publication.

The Examiner also cited Cordora and Moll in combination with the French patent publication to support a rejection of several claims. As an initial matter, Cordora and Moll have nothing to do with the apparatus and method defined in the present invention. The apparatus and method defined in the present application enhances the payout of the welding wire from the container. Cordora and Moll have nothing to do with such a concept. As such, it is not clear to Applicants the motivation to combine any teachings from Cordora and Moll with the French patent publication to support a rejection of any of the claims. Applicants submit that the motivation to combine, if any, provided by the Examiner is not from the cited references, but instead from Applicants disclosure. For at least

these reasons, the three cited references cannot be used to support a rejection of any of the pending claims.

Applicants submit that all the claims pending in the above-identified patent application are in allowable form.

Respectfully submitted,
FAY, SHARPE, FAGAN, MINNICH & MCKEE

By: 

BRIAN E. TURUNG

Reg. No. 35,394
1100 Superior Avenue, 7th Floor
Cleveland, Ohio 44114-2579
Telephone: (216) 861-5582
Facsimile: (216) 241-1666

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Adrian Machado
(SIGNATURE)



PROCESS AND DEVICE TO REEL A REEL OF WIRE AND MANUFACTURING MACHINE TOOLS OF SPRINGS IN WIRE FR 2 661 118 (Computer Translation)

DESCRIPTION

The present invention relates to a process and its device of implementation to reel a reel of wire and the manufacturing machine tools of springs in wire métallique. It is known to condition the wire in the form of reels which are consisted a great quantity of whorls juxtaposées. Les reels of wire obtained constitute a compact unit, of appreciably cylindrical external form, inside whose is an empty space, appreciably cylindrical and appreciably coaxial with the external cylindrical form; certain reels are thus crossed by a tree which fills empty space appreciably, which tree is generally finished at each end by a side disc whose diameter is higher or equal to the diameter external of the reel and is generally hollow; this type of reel provided with a tree finished by two discs is particularly used if either the wire is not very rigid, or the diameter external of the reel is large and in these cases the side tree and discs are means which make it possible to maintain the cohesion of the standard bobine. Ce of reel is relatively easy to reel; under the action of a traction of the wire according to an axis contained in a plan perpendicular to the axis of the reel to for this purpose, one generally lays out the reel on another tree which can turn freely and which penetrates in the hollow shaft of the reel.

Unfortunately, this type of reel equipped with a tree finished by two side discs involves the overcost of the investment relating to the tree and the discs, as well as costs of additional handling and transport, if this tree must be turned over to the manufacturer, after the reel has reeled, for a new intended use, to amortize the initial investment.

This is why, each time that is possible, the reels are conditioned without tree nor side discs, but simply maintained by a device of the hooping type, or by the application of a resistant retractable plastic film.

The present invention is more particularly intended for the type of reels which are conditioned without side discs.

Ave this type of reel, the user can choose to reel his wire according to two directions of traction of the wire: either according to a direction contained in a plan perpendicular to the axis of the reel, or according to a direction parallel with this axis.

In the first case, the user is obliged to go up on the reel on a tree in order to allow the rotation of the reel necessary to dévidement of the wire.

Concerning the manufacturing machine tools of spring in wire, the reels are often of big size and very doors; indeed, these machines work in a permanent way, with the result that the length of wire rolled up on the reel is important the weight of a reel generally exceeds 1 000 kg; moreover, these machines are generally equipped with a device which draws the length of wire necessary to manufacture from a spring, then which awaits the end of the production cycle of the spring to draw the length of wire necessary to manufacture from the following spring; it is thus seen that the consumption of wire by the manufacturing machine tool of spring is done by jolts; taking into account the important inertia of the reel, in rotation on the tree, one is then obliged to envisage a driving mechanism in rotation of the tree, generally an electric motor which will reel the coil lead uninterrupted so as to provide the wire corresponding to the temporal average of the instantaneous consumption of the manufacturing machine tool; in the case of stops or changes of rate of this machine one is then obliged to control dévidement reel and thus to control the operation of the electric motor, which leads to very complex devices, not very reliable, difficult to regulate and expensive.

The problem arising is thus to get a process to reel a reel of wire, conditioned without side discs, which is compatible with manufacturing machine tools of spring in wire likely to exert a traction of the wire by jolts, process which is simple, reliable, easy to regulate and inexpensive.

Another objective of the invention is to get a device of implementation of such a process.

A process according to the invention to reel a reel of the wire, conditioned without side discs in order to supply a machine is of the type in which one lays out the aforementioned reel so that his axis is appreciably vertical, one lays out a device of guidance of the wire extracted, appreciably on the aforementioned vertical axis, at a distance of the aforementioned reel, upstream of the aforementioned machine, so that a traction exerted by the aforementioned machine causes a traction on the aforementioned wire located immediately upstream of the aforesaid device of guidance, according to a direction slightly inclined by report/ratio to that the axis, comprises the following operations - one deforms at least the first whorl of the aforementioned reel, of the state of appreciably plane whorl to the state of appreciably helicoid whorl, - one maintains the

aforementioned first whorls near the reel thanks to means of reserve, equipped with fingers of centering, - one maintains the radius of curvature of the aforesaid first whorls superior with a minimal ray while making pass the aforementioned whorls outside of the aforesaid fingers of centering.

- one makes circulate the aforementioned wire located downstream from the aforementioned helicoid whorl in a rectification and expander of the aforesaid wire, located upstream of the aforesaid device of guidance.

A device according to the invention to reel a reel of wire, which winds has its appreciably vertical axis, an external diameter and an internal diameter, by a traction slightly tilted compared to the vertical, of the type comprising a free pulley in rotation, maintained by an arm support above the aforementioned reel, comprises average mobiles of reserve of at least the first whorl of the aforementioned reel of wire, which average comprise an appreciably plane part and means of centering so that the aforementioned first whorl cannot rise and come to be wedged in the aforementioned pulley or to leave the throat from the aforementioned pulley, during quel' one reels the aforementioned

In a preferential way, a device according to the invention comprises moreover one mobile ballast which can slide around of the aforesaid wire and which is located between the aforementioned means of reserve and the aforementioned pulley.

The advantages of the process according to the invention are that it makes it possible to reel a reel of wire conditioned without side discs, by implementing a device according to the very simple, reliable invention inexpensive, easy to regulate, easily removable, and that this process is adapted to all types of machines using of the wire, and particularly all manufacturing machine tools of metal springs starting from wire, in particular the machines which consume and draw the wire by jolts.

Following description refers to the drawings annexed which represent without any restrictive character, a mode of realization according to the invention.

Figure 1 is an overall picture of a device according to the invention.

Figure 2 is a sight in plan of a principal component of a device according to the invention.

Figure 3 is a half cut according to III-III of figure 2.

Figure 1 represents an overall picture of a device according to the invention and also

illustrates the principal operations of a process according to the invention. In order to facilitate the comprehension of the invention one represented on this figure a manufacturing machine tool of springs in wire 20; this type of machine is generally equipped with a device 12 called car-wire and a device of guidance of the aforesaid wire 16; this device of guidance 16 can for example consist of rollers or of pulleys the aforementioned car-wire 12 exerts a traction on a wire in order to supply the aforementioned machine 20. La traction exerted by the aforementioned machine 20 is represented by arrow T1, the aforementioned traction T1 can be exerted continuously or by jolts; a traction by jolts is generally used for the machines which draw the length of wire necessary to manufacture from a spring then which awaits the end of the production cycle of the spring to draw the length of wire necessary to manufacture from the following spring. The wire 1 is generally consisted a steel wire whose diameter generally lies between a tenth of millimetre and a few millimetres.

One represented on figure 1 a reel 2 of wire which is conditioned without disc side, this reel 2 is of appreciably cylindrical external form, the cylinder wrapping it being of D3 diameter; the aforementioned reel 2 is provided with a cylindrical cavity 19 vacuum, the aforementioned cylindrical cavity 19 having a diameter D4, the aforementioned reel 2 is consisted the juxtaposition of a multitude of whorls such as whorl 7, the aforementioned whorls having a diameter ranging between the aforementioned D4 diameter and the aforementioned D3 diameter. In the continuation of the document, one will indicate by average whorl, a fictitious whorl, appreciably plane which extends according to a circle whose diameter is equal to the average between the aforementioned internal diameter D4 of the aforementioned reel 2 and the aforementioned external diameter D3 of the aforementioned reel 2. Lesdits cylinders constituting the outer jacket of the aforementioned reel 2 and the aforementioned cavity 19 are appreciably coaxial of axis XX1; in the continuation of exposed one will speak about this axis XX1 as being the axis of the aforementioned reel 2.

One sees on figure 2 quel' one laid out the aforementioned reel 2 so that its axis XX1 is appreciably vertical; advantageously one laid out the aforementioned reel on a support equipped with vertical uprights 6; one also represented on the figure 1 a device of guidance 8 appreciably located on the aforementioned axis XX1 at a distance H of the aforementioned reel 2.

In the continuation of the document one will use the relative concepts upstream and downstream by considering the devices located on the advance of the aforesaid wire 1 between the

aforementioned reel 2 which thus constitutes the source the absolute upstream and the use by the aforementioned machine 20 which constitutes the downstream.

By using these concepts one sees that in a known way. a device to reel a reel of wire 1 in order to supply a manufacturing machine tool of spring 20, includes/understands devices of guidance 8 located upstream the aforementioned machine 20 so that a traction exerted by the aforementioned machine according to arrow T1 causes a T2 traction on the aforementioned wire located immediately upstream of the aforesaid device of guidance 8; it is seen that the aforementioned T2 traction is exerted according to a tilted direction of an angle A by report/ratio to that axis XX1; the aforementioned angle A is generally lower than 300. Lesdits average of guidance 8 are generally consisted a free pulley in rotation, maintained by an arm 9 support, with a height H audessus of the aforementioned reel 2; it is seen that the aforementioned T2 traction slightly tilted compared to the vertical tends to raise first whorls 7 of the aforementioned reel 2, like the aforementioned means of reserve 4, 5.

The aforementioned first whorls 7 are the whorls of the aforementioned reel 2 located at the higher part of this reel and are thus appreciably plane.

It is seen that in a process according to the invention one deforms at least first whorl 7 of the aforementioned reel 2 of the state of appreciably plane whorl to the state of appreciably helicoid whorl, one maintains the aforementioned whorl S near the reel thanks to the weight of the means of reserve 4. equipped with fingers of centering 5, one maintains the radius of curvature of the aforesaid first whorls 7 higher than a minimal ray while making pass the aforementioned whorls outside of the aforesaid fingers of centering 5, one makes circulate the aforementioned wire 1 located downstream from the aforementioned helicoid whorl in a device 3 of tension and rectification of the aforesaid wire, which device 3 is located upstream of the aforesaid device of guidance 8.

Advantageously, in a process according to the invention, the aforementioned tractions T1 and T2 comprise jolts, the aforementioned device 3 comprises at least a moving part, and the length of the aforesaid wire 1 lain between the aforementioned helicoid whorl and the aforementioned means of guidance 8 is variable according to the position of the aforementioned moving part of the aforesaid device 3 of tension and rectification, so that a variation the aforementioned length of the aforesaid wire 1 ranging between the aforementioned helicoid whorl and the aforementioned means

of guidance 8 makes it possible to deaden the effects of the aforesaid jolts of the aforesaid tractions T1 and T2.

One sees on figure 1 that the device according to the invention comprises average mobiles 4, 5 of reserve of at least first whorl 7 of the aforementioned reel 2 of wire 1, which average comprise an appreciably plane part 4 and means of centering 5 so that the aforementioned first whorl 7 cannot rise and come to be wedged in the aforementioned pulley or to leave the throat from the aforementioned pulley during quel' one reels the aforementioned reel 2.

Advantageously, the device according to the invention, comprises a mobile ballast 3 which can slide around of the aforesaid wire 1 and which is located between the aforementioned means of reserve 4, 5 and the aforementioned pulley 8.

One sees on figure 1 that the aforementioned mobile ballast 3 comprises at least a tubular part in which the aforementioned wire passes 1 so that this one is rectified at the time of its passage inside the aforementioned tubular part.

The aforementioned mobile ballast 3 can advantageously be consisted a tube made out of synthetic matter; in a device according to the invention, the relationship between the mass of the aforesaid ballast mobile 3 and masses it of an average whorl of the aforementioned reel of wire and ranging between 5 and 30 and is preferably about 15 to 20.

One sees on figure 1 that the aforementioned means of reserve 4, 5, cooperate with the aforementioned first whorls 7 of the aforementioned reel 2 so that, under the effect of the average of the aforesaid weights of reserve 4, 5, the aforementioned whorls are maintained near the aforementioned reel 2 and cannot rise under the effect of T2 traction and come to be wedged in the aforementioned means of guidance 8.

It is also seen that the aforementioned means of reserve 4, 5 authorize the exit of the aforesaid wire 1 of the aforementioned whorl 7 by the periphery of the aforementioned part planes 4.

One sees that under the effect of the aforementioned T2 traction the aforementioned wire 1 tends to raise the aforementioned means of reserve 4, 5 and that under the effect of the aforementioned the aforementioned T2 traction left planes 4 occupies a position inclined compared to the higher part of the aforementioned reel 2, because of his mobility; in these average of the aforesaid movements of reserve 4, 5 due to the interaction between the aforementioned wire 1 and

the aforementioned part planes 4, the aforementioned means of reserve are maintained appreciably centered thanks to the known as fingers of centering 5; one indeed sees on figure 1 that the aforementioned fingers of centering 5 are engaged by their loose lead 21 in the aforementioned appreciably cylindrical space 19 located at the center of the aforementioned reel 2 so that at the time of the average of the aforesaid movements of reserve 4, 5 pennies the effect of the aforementioned T2 traction the aforementioned means of reserve remain in the vicinity immediate of the aforementioned reel 2 and maintain thus the aforementioned first whorls 7.

Advantageously with an aim of maintaining the aforementioned whorls 7 near the aforementioned reel 2, the aforementioned means of reserve 4, 5 have a mass much higher than the mass of the aforementioned average whorl of the aforementioned reel of wire 2; preferentially the mass of the aforesaid means of reserve 4, 5, is at least equal to hundred times the mass of an average whorl of the aforementioned reel of wire; it is also seen that the aforementioned first whorls 7 are rolled up outside of the aforesaid fingers of centering 5 so that their curve is limited and the permanent deformation of the aforesaid wire cannot cause 1. One sees on figure 1 that to leaving of the aforesaid means reserve 4, 5 the aforementioned wire 1 resulting of the aforesaid whorls 7 passes inside of the aforesaid tube 3 before being directed towards the aforementioned means of guidance 8. Ledit tube 3 constitutes at the same time a ballast and a means of rectification of the aforesaid wire 1; indeed, the aforementioned tube 3 whose mass is large compared to the mass of the aforementioned average whorl tends to bring the aforementioned wire 1 worms the aforementioned axis XX1 is with the vertical of the aforementioned pulley 8; one sees thus that the aforementioned tube 3 component a mobile ballast tends to maintain angle A of slope between the aforementioned wire 1 located upstream of the aforesaid device of guidance 8 and XX1 with low values generally lower than 300 centers it; it is seen that because of the mass of the aforesaid mobile ballast 3 and of the deviation which it operates in circulation of the aforesaid wire 1 between the aforementioned means of reserve 4 and the aforementioned means of guidance 8, the length of the aforesaid wire 1 ranging between the whorls located upstream of the aforesaid means of reserve 4 and the aforementioned means of guidance 8 is variable according to the position of the aforesaid ballast 3. On sees that thus constitutes itself between the aforementioned means of reserve 4 and the aforementioned means of guidance 8, a reserve length of wire which makes it possible to deaden the

effects of the aforesaid àcous of the aforementioned traction T1. Advantageously, in the device according to the invention presented on figure 1, the relationship between the aforementioned height H and the aforementioned diameter external D3 of the aforementioned reel 2 lie between 1 and 5 and preferably ranging between 2 and 3.

In a preferential mode of realization of a device according to the invention, the aforementioned part planes 4 of the aforesaid means of reserve is circular, of external diameter D1 and center C and the relationship between the aforementioned diameters external D3 of the aforementioned reel and the aforementioned diameter external D1 of the aforementioned part planes 4 lies between 0,8 and 1,5 and preferably ranging between 1 and 1,25.

One also sees that in a preferential mode of realization, the aforementioned arm support 9 is assembled swivelling around an axis compared to a support fixes 15, which arm 9 comprises at an end the aforementioned pulley 8 and comprises at his other end located at opposite of the first by report/ratio to that the fulcrum pin, a face 14 and the aforementioned device include/understand a spring 10 whose end is fixed to that the support fixes 15 and the other end is fixed at the aforementioned pulley 8; it includes/understands a detector of contact 11 equipped with a feeler 13 which can detect the contact between the aforementioned face 14 of the aforesaid arm support 9 and the aforementioned feeler, and to start an informing warning system of a malfunction.

Figure 2 illustrates a preferential mode of realization of the aforesaid means of reserve 4, 5 according to the invention; one sees on figure 2 that the aforementioned part planes 4 is consisted an appreciably circular disc of D1 diameter and center C.

In the preferential mode of realization according to the invention represented on this figure, the means of reserves comprise means of connection 18 between the aforementioned disc 4 and the aforementioned fingers of centering 5; advantageously, the aforementioned means of connection 18 are consisted a crown fixed on the aforementioned disc 4 by welding. and on which three fingers 5 themselves are fixed, by welding also.

Advantageously, the D2 diameter of the aforementioned crown has a value ranging between the values of the aforesaid D3 diameter and D4 of the aforementioned reel.

Figure 3 is a half-section according to III-III of figure 2; one also sees on this figure that each one of the aforesaid fingers of centering 5 is welded by an end 17 onto the aforementioned crown

18, which is ellemême welded onto the aforementioned circular plate.

It is seen that the aforementioned means of reserve have an axis of symmetry XX2 which passes by the aforementioned center C of the aforementioned plate 4 and which is perpendicular to the aforementioned plate 4.

Advantageously, the aforementioned fingers of centering 5 are curved in form de11511, so that their loose lead 21 is located at a distance D5 of the aforesaid axis XX2, which distance is lower than half of the aforesaid internal diameter of the aforementioned reel, D E such kind that the fingers can engage in open space 19 of the aforementioned reel (not represented).

The technical field of the invention is that of the manufacturing machine tools of objects in wire.

CLAIMS

1. Proceeded to reel a reel (2) of wire (1), conditioned without side discs, in order to supply a machine (20) in which one lays out the aforementioned reel so that its axe(XX1) is appreciably vertical, one lays out a device of guidance (8) of the wire extracted, appreciably on the aforementioned axis (XX1), at a distance (H) of the aforementioned reel (2), upstream of the aforementioned machine (20), so that a traction (T1) exerted by the aforementioned machine causes a traction (T2) on the aforementioned wire located immediately upstream of the aforesaid device of guidance (8), according to a direction slightly inclined by report/ratio 1 on dispose ladite bobine de sorte que son axe(XX1) soit sensiblement vertical, on dispose un dispositif de guidage (8) du fil métallique extrait, sensiblement sur ledit axe (XX1), à une distance (H) de ladite bobine (2), en amont de ladite machine (20), de sorte qu' une traction (T1) exercée par ladite machine provoque une traction (T2) sur ledit fil métallique situé immédiatement en amont dudit dispositif de guidage (8), selon une direction faiblement inclinée par rapport audit axe(XX1) characterized in that - one deforms at least the first whorl (7) of the aforementioned reel (2), of the state of appreciably plane whorl to the state of appreciably helicoid whorl, - one maintains the aforementioned first whorls (7) near the reel thanks to means of reserve (4), equipped with fingers of centering (5) - one maintains the radius of curvature of the aforesaid first whorls (7) superior with a minimal radius while making pass the aforementioned whorls outside of the aforesaid fingers of centering (5). - one makes

circulate the aforementioned wire (1) located downstream from the aforementioned helicoid whorl in a device (3) of tension and rectification of the aforesaid wire, located upstream of the aforesaid device of guidance (8).

2. Proceeded according to claim 1 in which the aforementioned traction (T1) comprises with blows, characterized in that the aforementioned device (3) comprises at least a moving part, and in what the length of the aforesaid wire (1) ranging between the aforementioned helicoid whorl and the aforementioned means of guidance (8) is variable according to the position of the aforementioned moving part of the aforesaid device (3) of tension and rectification so that a variation the aforementioned length of the aforesaid wire (1) ranging between the aforementioned helicoid whorl and the aforementioned means of guidance (8), allows to deaden the effects of the aforesaid jolts of the aforementioned traction(T1).

3. Device to reel a reel (2) of wire (1) which winds has its axe(XXI) appreciably vertical, an external diameter (D3) and a diameter intérieur(D4), by a traction slightly tilted compared to the vertical, of the type comprising a free pulley (8) in rotation, maintained by an arm (9) support with a height (H) above the aforementioned reel (2) characterized in that it comprises of the average mobiles (4, 5) of reserve of at least the first whorl (7) of the aforementioned reel (2) of wire (1), which average comprise an appreciably plane part (4) and means of centering (5) so that the aforementioned first whorl (7) can rise and come to wedge themselves in the aforementioned pulley or to leave the throat from the aforementioned pulley, during quel' one reels the aforementioned reel (2).

4. Device according to claim 3 characterized in that it comprises a mobile ballast (3) which can slide around of the aforesaid wire (1) and which is located between the aforementioned means of reserve (4, 5) and the aforementioned pulley (8).

5. Device according to claim 4 characterized in that the aforementioned mobile ballast (3) comprises at least a tubular part in which passes the aforementioned wire (1) so that this one is

rectified at the time of its passage inside the aforementioned tubular part.

6. Device according to any of claims 4 to 5 characterized in that the relationship between the mass masses of the aforesaid ballast mobile (3) and it of an average whorl of the aforementioned reel of wire is included/understood between 5 and 30 and preferably about 15 to 20.

7. Device according to any of claims 3 to 6 characterized in that the relationship between the aforementioned height (H) and the aforementioned diameter external (D3) of the aforementioned reel (2) lies between 1 and 5 and preferably ranging between 2 and 3.

8. Device according to any of claims 3 to 7 characterized in that the aforementioned part planes (4) of the aforesaid means of reserve is circular, of diameter external (D1) and center (C) and in what the relationship between the aforementioned diameter external (D3) of the aforementioned reel and the aforementioned diameter external (D1) of the aforementioned plane part lies between 0,8 and 1,5 and preferably ranging between 1 and 1,25.

9. Device according to any of claims 3 to 8 characterized in that the aforementioned means of centering (5) are consisted at least two fingers and preferably three fingers, each finger having a first end (17) bound rigidly to the aforementioned plane part (4), and a second end (21) committed in the open space (19) located inside the aforementioned reel (2), so that the aforementioned means of reserve (4, 5) remain appreciably centered compared to the aforementioned reel while being able to move compared to this one.

10 Device according to any of claims 3 to 9 characterized in that the aforementioned arm support (9) is assembled swivelling around an axis compared to a fixed support (a 15), which arm (9) comprises at an end the aforementioned pulley (8) and comprises at its other end located contrary to the first by report/ratio to that the fulcrum pin, face (14) and in what it includes/understands a spring (10) whose end is fixed to that the support fixes (15) and the other end is fixed at the aforementioned pulley (8), and it includes/understands a detector of contact (11) equipped with a

feeler (13) which can detect the contact between the aforementioned face and the aforementioned feeler and starts an informing warning system of a malfunction.

11 Machine to manufacture metal springs starting from wire characterized in that it comprises a device according to any of claims 3 to 10.

Abstract

The present invention relates to a method and its implementation device for winding off a reel of wire. The device according to the invention includes a pulley (8) free to rotate, held by a support arm (9) at a height (H) above the said reel (2), characterised in that it includes movable means (4, 5) for retaining at least the first turn (7) of the said reel (2) of wire (1), which means include a substantially planar portion (4) and centring means (5) so that the said first turn (7) cannot be raised up and become jammed in the said pulley or leave the groove of the said pulley, while the said reel (2) is being wound off. The technical field of the invention is that of machines for manufacturing objects made of wire.